

9/30/88

**SITE ASSESSMENT**  
**FOR**  
**PARSONS CHEMICAL WORKS**  
**GRAND LEDGE, MICHIGAN**

**Prepared for:**  
**U.S. Environmental Protection Agency**  
**Region V**  
**230 South Dearborn Street**  
**Chicago, Illinois**

**CONTRACT NO. 68-01-7367**

**TAT-05-G2-00660**

**TDD NO. 5-8807-05**

**Prepared by:**  
**WESTON-SPER**  
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**Region V**

**September 1988**



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## 1.0 SITE DESCRIPTION

Parsons Chemical Works (PCW) is a former pesticide formulation plant located approximately one-quarter mile east of the intersection of M-43, Grand Ledge Highway, and Lawson Road in Grand Ledge, Michigan (NW 1/4, NE 1/4, Section 10 - 4N., R.4W., Eaton County) (Figure 1). The property is bordered to the north by an abandoned clay products company and an archery equipment manufacturer, to the east by a residential subdivision, to the south by a printing company, and to the west by a community church (Figure 2). The terrain is flat but begins to slope north towards the Grand River. Presently the site is owned by ETM Enterprises, Inc. (ETM), a manufacturer of fiberglass products.

There are two intermittent bodies of water which are located in the proximity of the site: an unnamed stream located west to northwest, and Sandstone Creek located east. Both the stream and creek merge with the Grand River which flows to the northwest. Surface water runoff from the site drains north towards the Grand Ledge ditch. A storm drain exists on the ETM property and connects to a closed catch basin leading to a county drain that discharges to the unnamed stream (Figure 2). Soils in these area consist primarily of clay loam.

## 2.0 SITE HISTORY

The former PCW has been engaged in the mixing, manufacturing, and packaging of agricultural chemicals including pesticides, herbicides, solvents, and mercury-based compounds. PCW operated at this location from April 16, 1945 until its closure in the summer of 1979. A septic tank and field tile system was installed in the mid-1950s and used for the disposal of sanitary sewage and wash waters. According to Michigan Department of Natural Resources (MDNR) files, floor drains were used for discharging wash waters from inside the building to the surrounding soils. The tank and field tile system were determined to be hydraulically connected to the closed catch basin and the county drain leading to the unnamed stream. PCW was also known to have stored chemicals in a location known as the barn site. The former barn site was located approximately 1 mile northwest of PCW in Oneida Township. The barn burned down in 1982, and shortly after the foundation was filled and graded. According to MDNR files, sampling had not been conducted at the barn site.

### 2.1 State and Federal Involvement

The PCW site has been the object of several investigations at the federal, state, and county levels. Concerns arose from the MDNR Surface Water Quality Division (SWQD) in 1979 and 1980 when sediment samples collected in the unnamed stream and the Grand

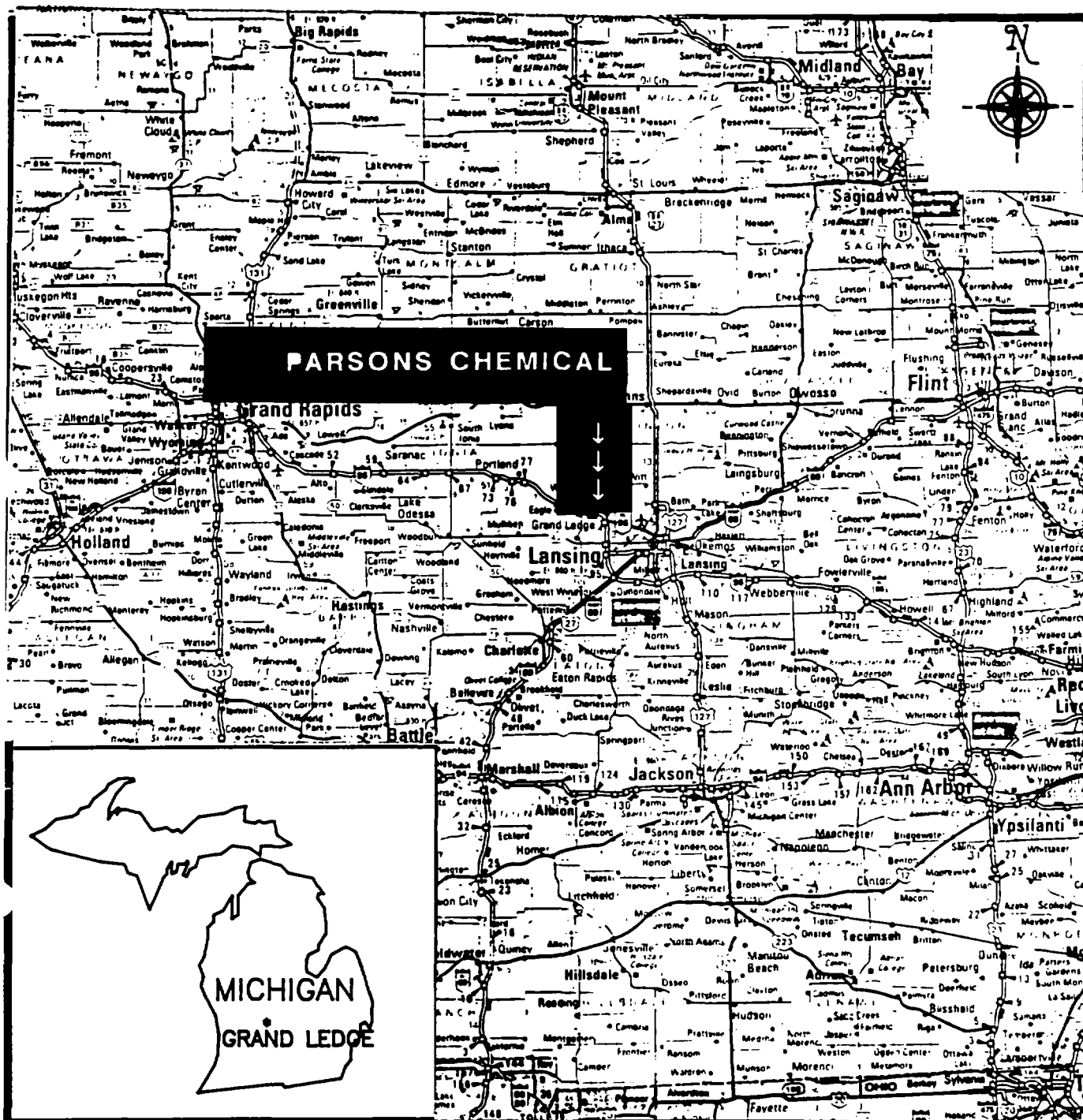


FIGURE 1  
SITE LOCATION  
PARSONS CHEMICAL  
GRAND LEDGE, MICHIGAN  
NOT TO SCALE

**WESTON**  
MANAGERS DESIGNERS/CONSULTANTS

DRAWN BY  
P.GURIA

DATE  
8-22-88

PCS #  
1571

APPROVED BY  
LA

DATE  
10-4-88

TDD #  
5880705

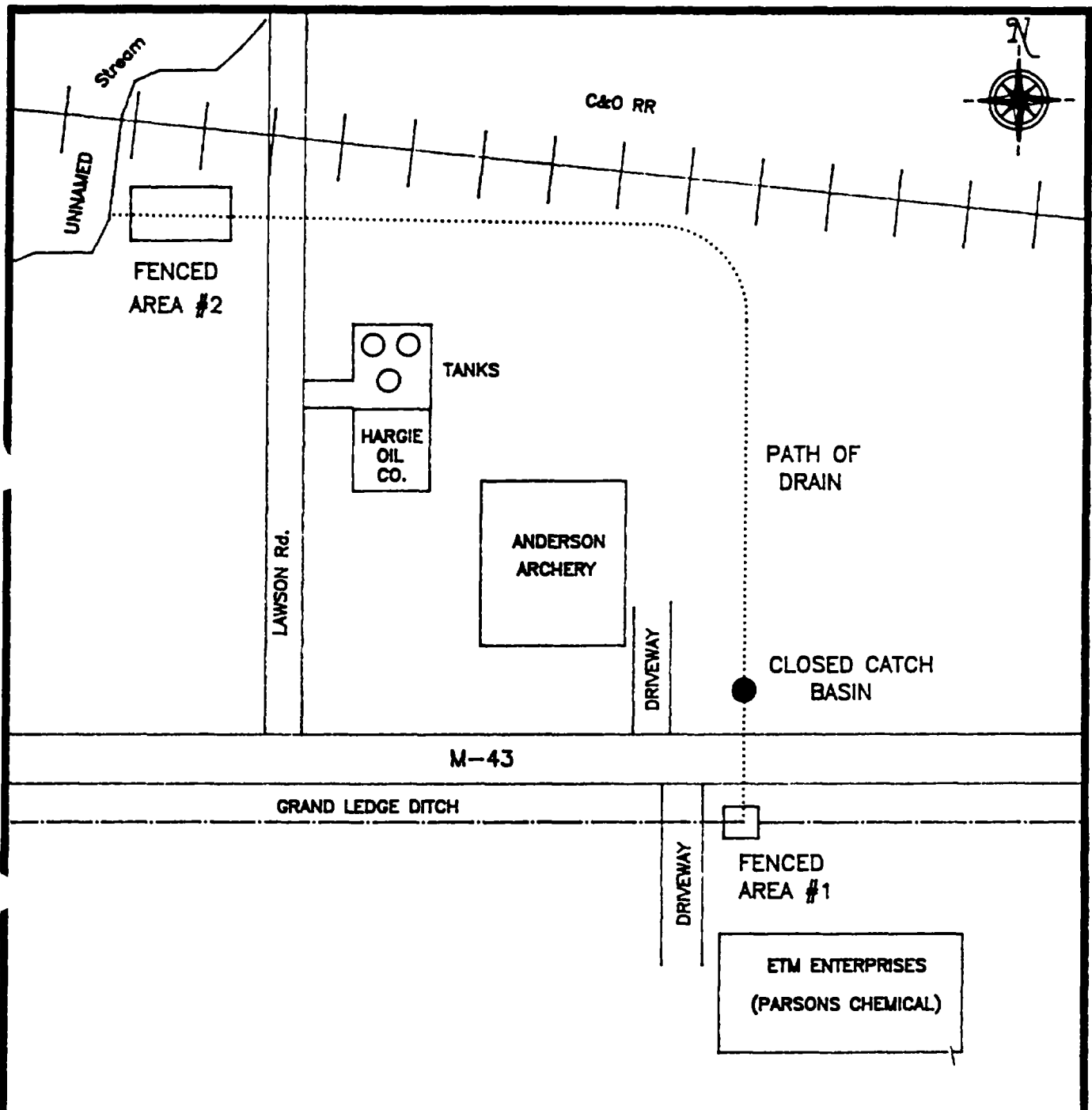


FIGURE 2  
DRAINAGE SYSTEM LAYOUT  
PARSONS CHEMICAL  
GRAND LEDGE, MICHIGAN  
NOT TO SCALE



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P.GURIA

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Ledge ditch on the ETM property were identified as containing elevated levels of mercury, lead, and arsenic, and detectable levels of pesticides, including dichlorodiphenyltrichloroethane (DDT) and chlordane.

In 1980, Keck Consulting Services (KCS) was contracted by ETM to perform a hydrogeological study to determine the source of contamination. Additional sampling revealed pesticides, inorganics, and semi-volatiles in site soils and sediments from the ditch and unnamed stream. KCS also had identified the septic tank and field tile system were hydraulically connected to the county drain. In 1983, KCS recommended excavation and removal of the septic system and soils within six feet of the septic lines. Excavation and disposal were completed by ETM in 1983.

Due to historical information and previous MDNR sampling results, the U.S. Environmental Protection Agency (U.S. EPA) chose the PCW site for the Tier 3 dioxin screening under the National Dioxin Study. Subsequent samples collected by the U.S. EPA Field Investigation Team (FIT) as part of the Tier 3 screening revealed the presence of 2,3,7,8- tetrachlorodibenzo-p-dioxins (TCDD) in the Grand Ledge ditch sediments on ETM property at concentrations of 1.13 parts per billion (ppb) at the surface, and 0.56 ppb 18 inches below surface. These samples were collected in an area where the field tile system meets the Grand Ledge ditch (Figure 2 - Fence area #1). Results are summarized in Table 1.

In May 1985, the MDNR Remedial Action Section of the Ground Water Quality Division (GWQD) requested that the U.S. EPA Emergency Response Branch conduct an immediate removal, under paragraph (b) (2) of part 300.65 of the National Contingency Plan (NCP), of contaminated ditch sediments, and additionally impose surface controls to prevent further release of contaminants at the site. In May, the Michigan Department of Public Health (MDPH) had also recommended to the Remedial Action Section of the MDNR that appropriate interim actions be taken to isolate or remove the potential for exposure to dioxin contaminated soils in the Grand Ledge ditch where concentrations exceeded the 1 ppb TCDD U.S. EPA recommended level. The U.S. EPA responded to the GWQD by suggesting that the Grand Ledge ditch be filled with gravel, and the drainage pipe be extended through the ditch, backfilled with gravel, and paved over with asphalt. The U.S. EPA also scheduled further sampling of subsurface soils at the site. The SWQD sampled fish and sediments from the Grand River to aid in determining the score for the site under the Michigan Environmental Response Act.



**TABLE 1**

**E&E SURFACE AND SUBSURFACE SOIL SAMPLE RESULTS  
PARSONS CHEMICAL WORKS  
GRAND LEDGE, MICHIGAN**

PARAMETERS*	-----1984-----		-----1985-----	
	DEO 14112 (SURFACE)	DEO 14113 (18" BELOW) ( SURFACE )	SL37 (SURFACE)	SL38 (SURFACE)
<b>PESTICIDES</b>				
Dieldrin	NA	8,700	23	87
4-4 DDE	NA	7,800	48	150
4-4 DDD	NA	43,000	31	130
4-4 DDT	NA	42,000	150	850
Methoxychlor	NA	NA	80	80
Chlordane	NA	38,000	120	560
<b>DIOXINS</b>				
2,3,7,8 TCDD	1.13	0.56	ND	ND
2,3,7,8 TCDF	NA	NA	0.001	ND
HxCDD	NA	0.10	0.048	0.054
HpCDF	NA	6.50	0.027	0.068
OCDD	NA	47.20	1.410	1.541
OCDF	NA	7.56	0.048	0.124

\*ppb - parts per billion

ND - Not detected

NA - Not analyzed

Adapted from: Ecology and Environment Tier 3-Dioxin Screening  
Final Report, 1986.

In June 1985, the MDPH and the GWQD fenced off an area 10 feet x 12 feet surrounding the Grand Ledge ditch on ETM property where the field tile meets road M-43, and an area 80 feet x 40 feet where the county drain discharges to the unnamed stream. On June 11 and 12, 1985, the U.S. EPA FIT conducted further Tier 3 dioxin screening to help determine the extent of the TCDD contamination and migration via surface water to the unnamed stream. The GWQD issued a memo to the U.S. EPA declining Federal assistance in the removal action for the ETM site. The GWQD planned to pursue state funds for the action.

The U.S. EPA Tier 3-dioxin screening report was published in May 1986. The MDPH review concluded there was no need for immediate or emergency action since the two major areas of contamination were fenced.

In 1987, the Division of Toxicology, Center of Environmental Health Science, MDPH, evaluated the analysis of the Tier 3-dioxin study performed in 1984-85. The MDPH concluded that the PCW site as well as chemical contaminants identified in the sediments of the unnamed stream did not pose a significant health threat. However, the MDPH reported that there is a health threat to children under the age of five who come in contact with the soils and/or sediments.

### 3.0 SITE ASSESSMENT

On July 20, 1988, Technical Assistance Team (TAT) members Dan Capone and Pete Guria met with U.S. EPA On-Scene Coordinator (OSC) Peter Neithercut, and MDNR representative Pat Donovan to conduct a general site tour of the ETM facility.

Mr. Donovan guided the TAT and OSC Neithercut to the fenced portion location of the Grand Ledge ditch located on the ETM property. This 10 foot x 12 foot area was observed to be overgrown with weeds and other flora. Surface water runoff from the roadway (M-43) had begun to erode an area, leaving an approximate one foot gap between the fence and the ditch. No discolored soil or evidence of chemicals was observed (Figure 2).

The TAT observed the ditch connected to the catch basin across the road by an underground drain (Figure 2). A visual inspection inside the catch basin revealed a very low level of standing water and the presence of two connections: one to the Grand Ledge ditch, and another to an unnamed creek northwest of the site.

Mr. Donovan showed the TAT and OSC Neithercut the proposed path of the underground drain leading to a second fenced section approximately 400 yards away. The area was observed to be approximately 80 feet x 40 feet located at the base of the railroad tracks and gently sloping southwest to an unnamed stream (Figure 2). Stream bed evidence indicated the water level to be extremely lower than normal. The area within the fence was observed to be overgrown with small trees, bushes, and other flora. Surface water runoff from the railroad slope had eroded soils below the fence leaving a four foot gap. This erosion of soils has exposed the old clay drain pipe revealing separation of the present pipe sections. Surface depressions directly east of the fence between the road indicated the possibility that the underground drain had collapsed. No evidence of chemicals or discolorations in the soil or water was observed.

The unnamed stream passing under the railroad tracks emerged in heavily vegetated area to the north. The low water level revealed some scattered debris in the stream bed. No indication of discolored water or soil was observed.

#### 4.0 ANALYTICAL RESULTS

##### 4.1 Sampling History

Tier 3-dioxin screening began in November 1984, as a result of the KCS report which determined the source of contamination. Nineteen sample locations were selected from surface and subsurface soils on the ETM property. All were analyzed for TCDD, volatile and semi-volatile organics, pesticides, and metals. Varying levels of these constituents were found and are discussed in the following sections. In addition, three samples were analyzed for dioxin and furan isomer contamination. Detectable levels were present in all three samples analyzed for these parameters.

A second tier 3-dioxin study was conducted in June, 1985, focusing primarily on sediments in the Grand Ledge ditch, a closed catch basin and discharge area to an unnamed stream, as well as surface water and bottom sediments from the Grand River and unnamed stream. Elevated levels of pesticides were detected in sediment samples collected at the outfall to the unnamed stream, the unnamed stream itself, and a location approximately 200 feet downstream. Low levels of dioxin were also detected at these same sample collection points (Table 2). Elevated levels of pesticides and inorganics were detected in the surface water sample from the closed catch basin (Table 3). Additionally, cyanide concentrations were as high as 148 ppb.

TABLE 2

E&E SEDIMENT SAMPLE RESULTS  
 PARSONS CHEMICAL WORKS  
 GRAND LEDGE, MICHIGAN  
 June, 1985

PARAMETERS*	UPSTREAM BACKGROUND SD26	UNNAMED STREAM SD27	UNNAMED DOWNSTREAM SD28	GRAND RIVER UPSTREAM SD25	UNNAMED STREAM DISCHARGE SD29	GRAND RIVER SD30
PESTICIDE						
-----						
Dieldrin	ND	180	41	ND	25	ND
4,4'-DDE	ND	270	17	ND	28	41
4,4"-DDD	ND	270	100	ND	100	85
4,4"-DDT	ND	1,400	16	ND	88	200
Methoxychlor	ND	2,900	ND	ND	ND	ND
Chlordane	ND	1,400	320	ND	190	170
DIOXINS - FURANS						
-----						
2,3,7,8 TCDD	ND	0.015	0.004	ND	0.005J	0.009
2,3,7,8 TCDF	ND	ND	ND	ND	ND	ND

\*ppb - parts per billion

ND - Not detected

J - Estimated

Adapted from: Ecology and Environment Tier 3-Dioxins Screening  
 Final Report, 1986

TABLE 3

E&E SURFACE WATER SAMPLE RESULTS  
PARSONS CHEMICAL WORKS  
GRAND LEDGE, MICHIGAN  
June, 1985

PARAMETERS*	UPSTREAM BACKGROUND SW26	DISCHARGE AREA SW27	UNNAMED STREAM SW28	GRAND RIVER BACKGROUND SW25	UNNAMED TO GRAND SW29	DOWNSTREAM GRAND RIVER SW30	CATCH BASIN SW31
PESTICIDE							
-----							
Dieldrin	ND	ND	ND	ND	ND	ND	3.8
4,4'-DDE	ND	ND	ND	ND	ND	ND	1.8
4,4'-DDT	ND	ND	ND	ND	ND	ND	.23
Chlordane	ND	ND	ND	ND	ND	ND	4.4
INORGANICS							
-----							
Arsenic	ND	ND	ND	ND	ND	ND	10.0
Lead	ND	ND	ND	ND	ND	6.1	5.0
Mercury	ND	ND	ND	ND	ND	ND	2.0
Cyanide	15.0	15.0	14.0	16	21	ND	148
DIOXINS - FURANS							
-----							
TCDD	ND	ND	ND	ND	ND	ND	ND
TCDF	ND	ND	ND	ND	ND	ND	ND

\*ppb - parts per billion

ND - Not detected

Adapted from: Ecology and Environment Tier 3-Dioxins Screening  
Final Report, 1986

#### 4.2 Grand Ledge Ditch Sediments

Results from samples collected in November 1984, on ETM property indicated levels of TCDD to be 1.13 ppb at the surface and 0.56 ppb 18 inches below the surface. An area approximately 10 feet x 12 feet was subsequently fenced in the Spring of 1985 (Figure 3). Three samples were collected outside the fenced area in June of that same year. Results from these samples did not reveal any levels of TCDD. Pesticide levels found in 1985 had decreased levels from the 1984 samples (Table 1).

#### 4.3 Catch Basin Samples

No samples were collected from this area in 1984. Surface water sampling completed in June 1985, indicated low levels of pesticides and inorganics (Table 2) (Figure 3). No dioxins were detected in any samples collected from this area.

#### 4.4 Discharge Area Sample Results

Sampling of sediments or surface waters was not conducted during the 1984 Tier 3-dioxin screening. Results of samples collected from surface waters in the unnamed stream (SW27) indicate inorganic levels slightly higher than background (Table 2). Dioxins and pesticides were not detected in water samples at this point. Sediment samples collected from the unnamed stream (SD 27) reveal varying levels of pesticides (Table 3). Dioxin was not present in any water samples collected at the discharge area.

#### 4.5 Grand River and Unnamed Stream Results

Surface water and sediment samples were not collected in 1984. Surface water samples collected from locations along the unnamed stream and Grand River in 1985 did not reveal pesticides or dioxins (Table 2). Inorganic levels of four primary constituents were not above background levels except at the point of discharge into the Grand River from the unnamed stream (SW 29), which had a slightly higher level of cyanide at 21 ppb (Table 2).

Sediment sample results for the Grand River and the unnamed stream are presented in Table 3. Results show elevated levels of pesticides in sediments at the drain discharge to the unnamed stream. The level of TCDD in this sample was 0.015 ppb. These levels of pesticides and dioxin decreased in samples collected down stream where the stream flows northward to meet the Grand River (Table 3) (Figure 4).

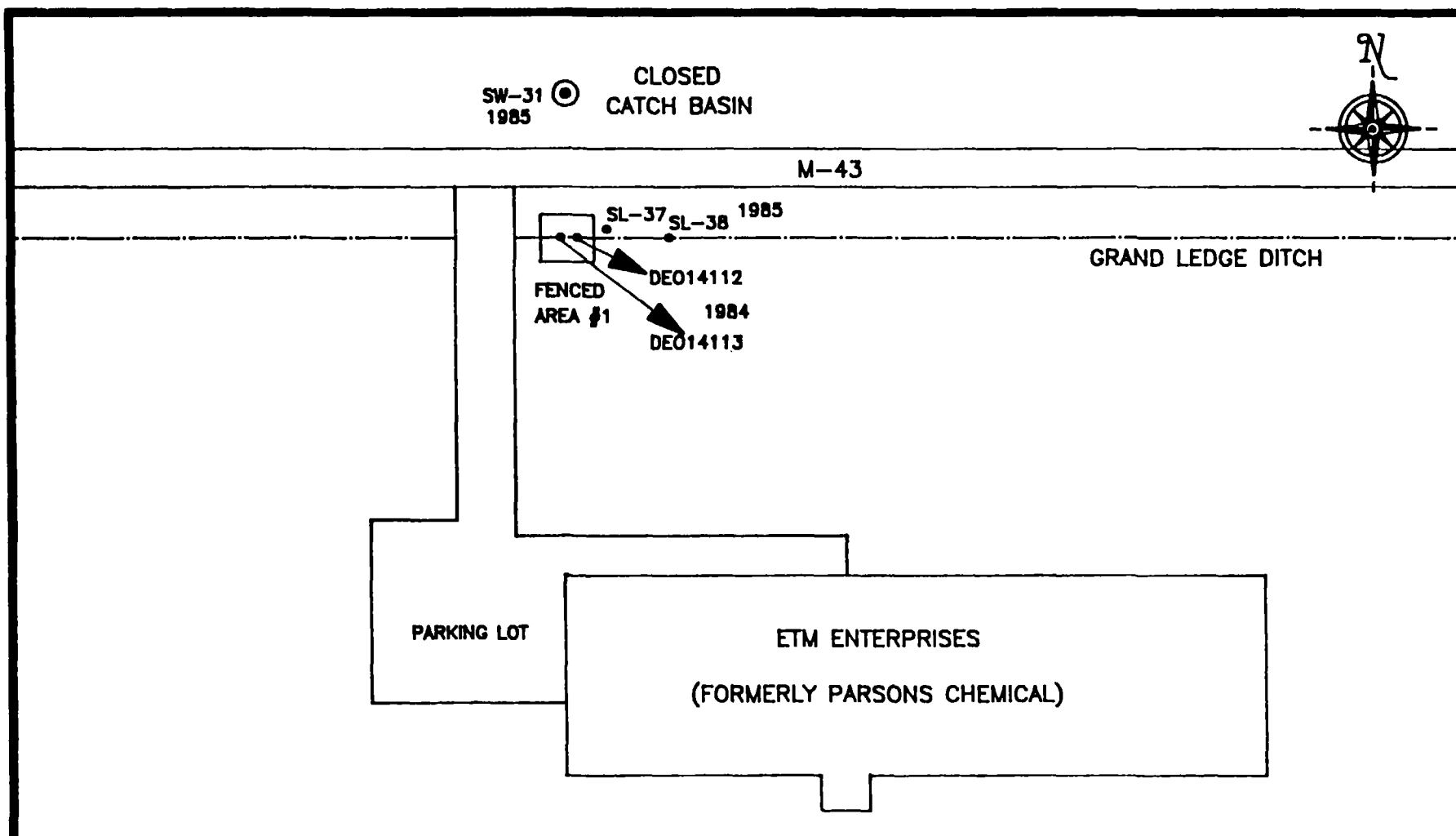


FIGURE 3  
SOIL SAMPLE LOCATIONS  
PARSONS CHEMICAL  
GRAND LEDGE, MICHIGAN  
NOT TO SCALE



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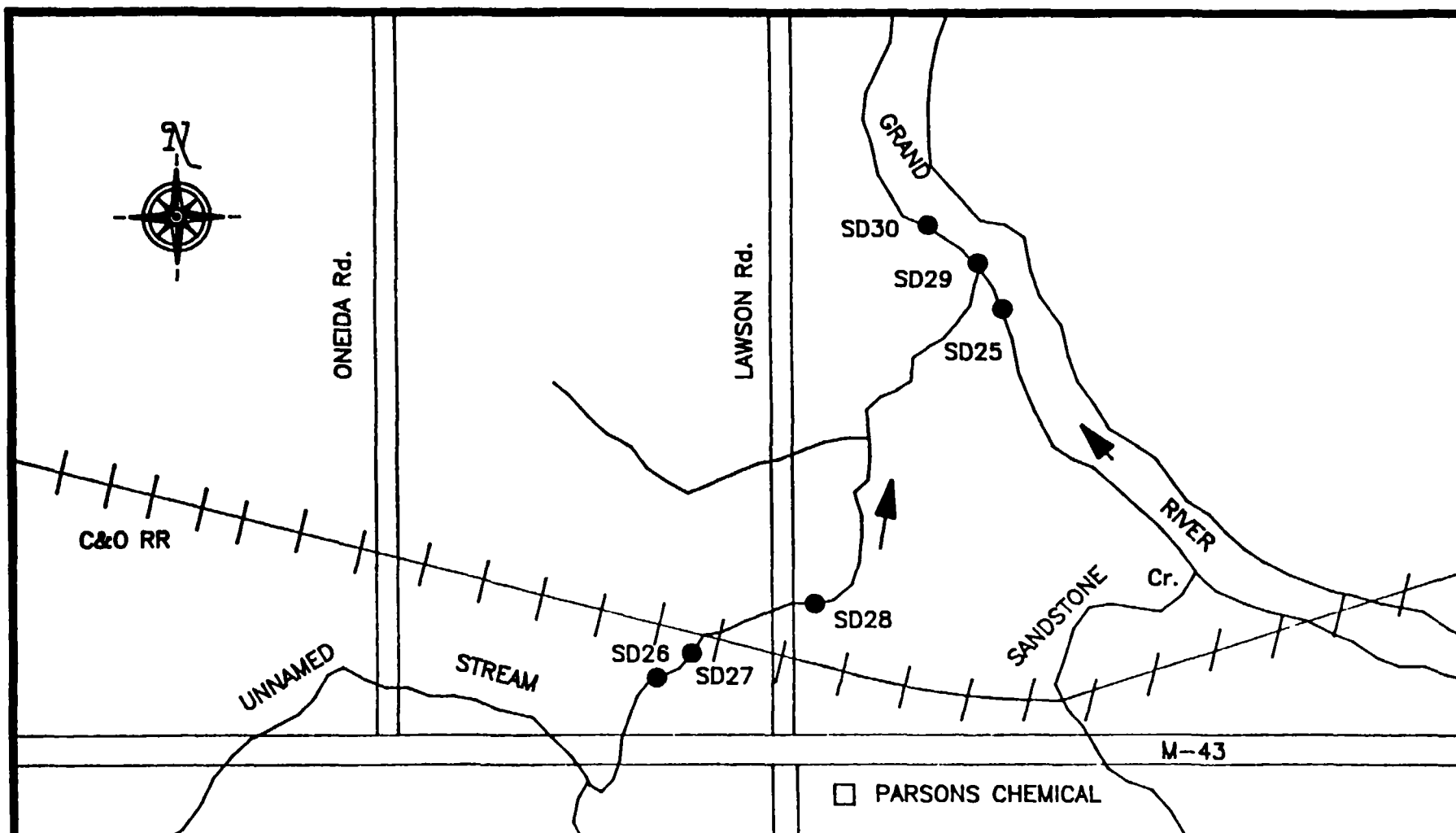


FIGURE 4  
WATER AND SEDIMENT SAMPLE LOCATIONS  
PARSONS CHEMICAL  
GRAND LEDGE, MICHIGAN  
NOT TO SCALE



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## 5.0 THREATS TO HUMAN HEALTH AND THE ENVIRONMENT

Sections 300.65 (b) (2) of the National Contingency Plan (NCP) outlines conditions which may be considered in determining the appropriateness of a removal action. Two of these criteria may exist within an area associated with the PCW site and includes:

- o Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations, animals, or the food chain; and,
- o Hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate.

## 6.0 RECOMMENDATIONS

Documented dioxin contamination is limited at the PCW site to the Grand Ledge ditch. The TAT recommends that the drainage pipe from the ETM driveway culvert be extended to connect with the M-43 culvert and a catch basin be installed at that point. In addition, the TAT recommends that the rest of the fenced area around the catch basin be paved with asphalt to prevent further erosion and potential migration of any residual contaminants.

No dioxin has been documented where the drain leads to the unnamed stream (fence area #2). Therefore, the TAT recommends replacing the collapsed drain in this area with suitable concrete pipe or an above ground concrete trough leading to the stream. This would prevent further erosion and potential contaminant migration. The fence should remain permanently surrounding this area.

Because the PCW site does meet two of the conditions set forth in the NCP, the TAT recommends submitting the past analytical results along with this report to the Agency for Toxic Substances and Disease Registry for their evaluation and recommendation. The TAT also recommends that "No Fishing" signs be placed along the unnamed stream between fence area #2 and the Grand River.

**ATTACHMENT A**

**PHOTOGRAPHS**

**PARSONS CHEMICAL WORKS  
GRAND LEDGE, MICHIGAN**

**JULY 20, 1988**



SITE: Parsons Chemical

DATE: 8-11-88

PHOTOGRAPH NUMBER: One

DIRECTION: East

TIME: 1130 am

CAMERA: OLYMPUS INFINITY 35MM

PHOTOGRAPHER: P. Guria

WITNESS: D. Capone

SUBJECT: 10' X 12' Fenced area #1 in the Grand Ledge ditch.



SITE: Parsons Chemical

DATE: 8-11-88

PHOTOGRAPH NUMBER: two

DIRECTION: outl

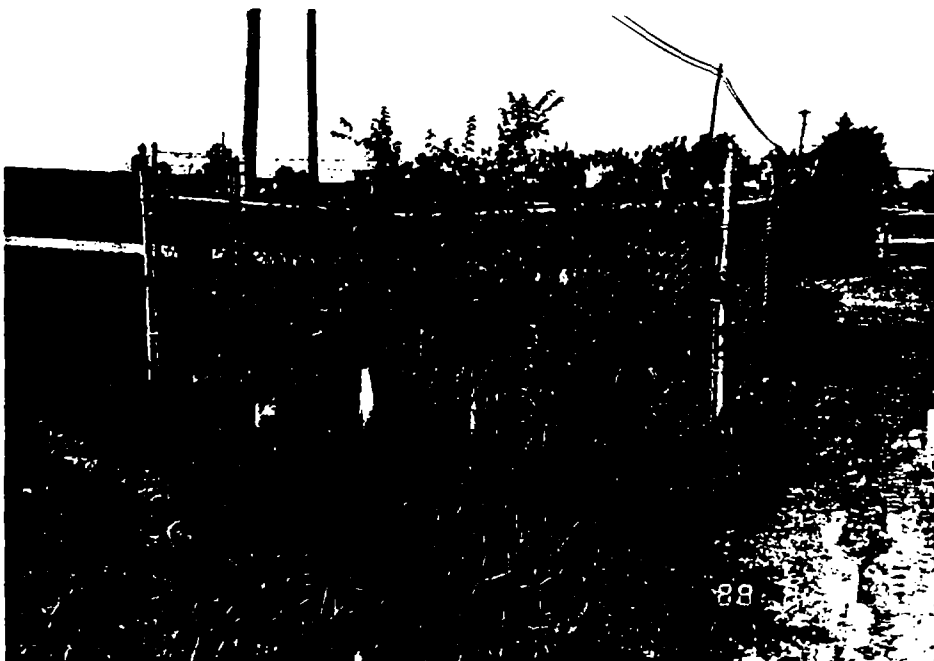
TIME: am

CAMERA: OLYMPUS INFINITY 35MM

PHOTOGRAPHER: P. Guria

WITNESS: D. Capone

SUBJECT: Erosional gap under fence, appears to be 1.5' deep.



SITE: Parsons Chemical DATE: 8-11-88  
PHOTOGRAPH NUMBER: three DIRECTION: West TIME: am  
CAMERA: OLYMPUS INFINITY 35MM  
PHOTOGRAPHER: P. Guria WITNESS: D. Capone  
SUBJECT: Fenced area #1 from shoulder of road.



SITE: Parsons Chemical DATE: 8-11-88  
PHOTOGRAPH NUMBER: four DIRECTION: North TIME: am  
CAMERA: OLYMPUS INFINITY 35MM  
PHOTOGRAPHER: P. Guria WITNESS: D. Capone  
SUBJECT: Looking into fenced area# 1 showing abundant plant growth.



SITE: Parsons Chemical

DATE: 8-11-88

PHOTOGRAPH NUMBER: five

DIRECTION: North

TIME: am

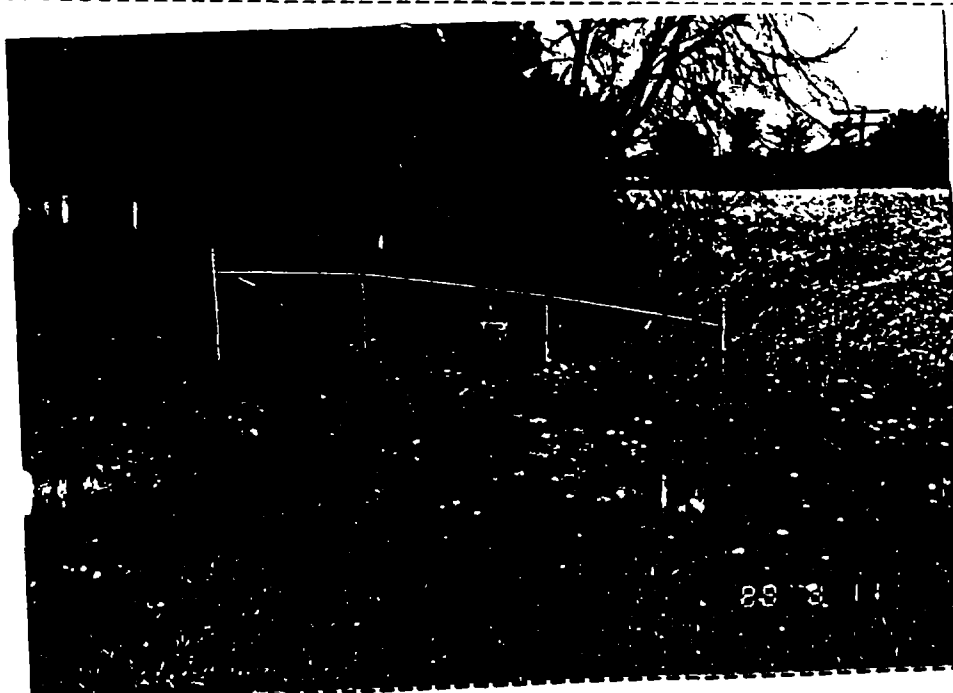
CAMERA: OLYMPUS INFINITY 35MM

PHOTOGRAPHER: P. Guria

WITNESS: D. Capone

SUBJECT:

Catch basin across the road connected to fenced area #.



SITE: Parsons Chemical

DATE: 8-11-88

PHOTOGRAPH NUMBER: six

DIRECTION: west

TIME: am

CAMERA: OLYMPUS INFINITY 35MM

PHOTOGRAPHER: P. Guria

WITNESS: D. Capone

SUBJECT: Looking west from Lawson road. Fenced area #2 showing dead tree and collapsed earth leading to fence. Area is approximately 80'x 40'.



SITE: Parsons Chemical

DATE: 8-11-88

PHOTOGRAPH NUMBER: seven

DIRECTION: west

TIME: pm

CAMERA: OLYMPUS INFINITY 35MM

PHOTOGRAPHER: P.Guria

WITNESS: D.Capone

SUBJECT: Collapsed and seperated drain tile under fenced area #2. Gap is approximately 3'.



SITE: Parsons Chemical

DATE: 8-11-88

PHOTOGRAPH NUMBER: eight

DIRECTION: northwest

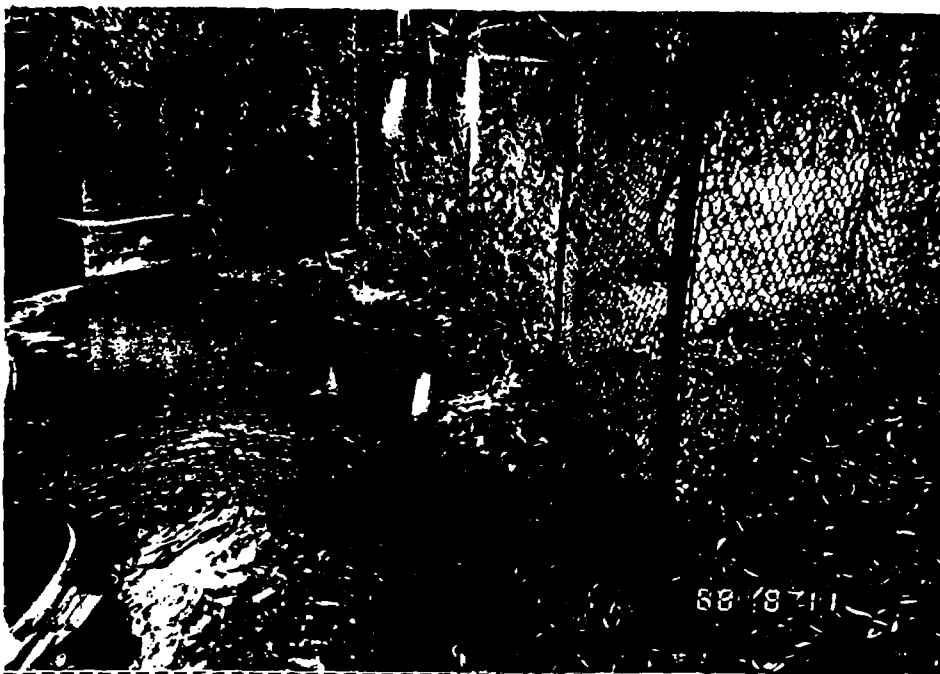
TIME: pm

CAMERA: OLYMPUS INFINITY 35MM

PHOTOGRAPHER: P.Guria

WITNESS: D.Capone

SUBJECT: Tarp over warning sign and damaged barbed wire fence.



SITE: Parsons Chemical

DATE: 8-11-88

PHOTOGRAPH NUMBER: nine

DIRECTION: NE

TIME: pm

CAMERA: OLYMPUS INFINITY 35MM

PHOTOGRAPHER: P.Guria *PG*

WITNESS: D.Capone

SUBJECT: N. chest side of fenced area #2. Discharge into unnamed stream.



SITE: Parsons Chemical

DATE: 8-11-88

PHOTOGRAPH NUMBER: ten

DIRECTION: NE

TIME: pm

CAMERA: OLYMPUS INFINITY 35MM

PHOTOGRAPHER: P.Guria *PG*

WITNESS: D.Capone

SUBJECT: Looking down from railroad tracks into area #2 showing dead trees and erosional surface.



SITE: Parsons Chemical

DATE: 8-11-88

PHOTOGRAPH NUMBER: eleven

DIRECTION: S

TIME: pm

CAMERA: OLYMPUS INFINITY 35MM

PHOTOGRAPHER: P.Guria *P*

WITNESS: D.Capone

SUBJECT: Looking down into area #2 from railroad tracks, discharge into unnamed stream.



SITE: Parsons Chemical

DATE: 8-11-88

PHOTOGRAPH NUMBER: twelve

DIRECTION: N

TIME: pm

CAMERA: OLYMPUS INFINITY 35MM

PHOTOGRAPHER: P.Guria *P*

WITNESS: D.Capone

SUBJECT: Unnamed stream emerging from under the railroad flowing north.





SITE: Parsons Chemical DATE: 8-11-88  
 PHOTOGRAPH NUMBER: thirteen DIRECTION: NW TIME: pm  
 CAMERA: OLYMPUS INFINITY 35MM  
 PHOTOGRAPHER: P. Guria WITNESS: D. Capone  
 SUBJECT: From Lawson road looking at area #2 showing dead trees in and around the fenced section.



SITE: Parsons Chemical DATE: 8-11-88  
 PHOTOGRAPH NUMBER: fourteen DIRECTION: S TIME: pm  
 CAMERA: OLYMPUS INFINITY 35MM  
 PHOTOGRAPHER: P. Guria WITNESS: D. Capone  
 SUBJECT: Location of the old barn site.